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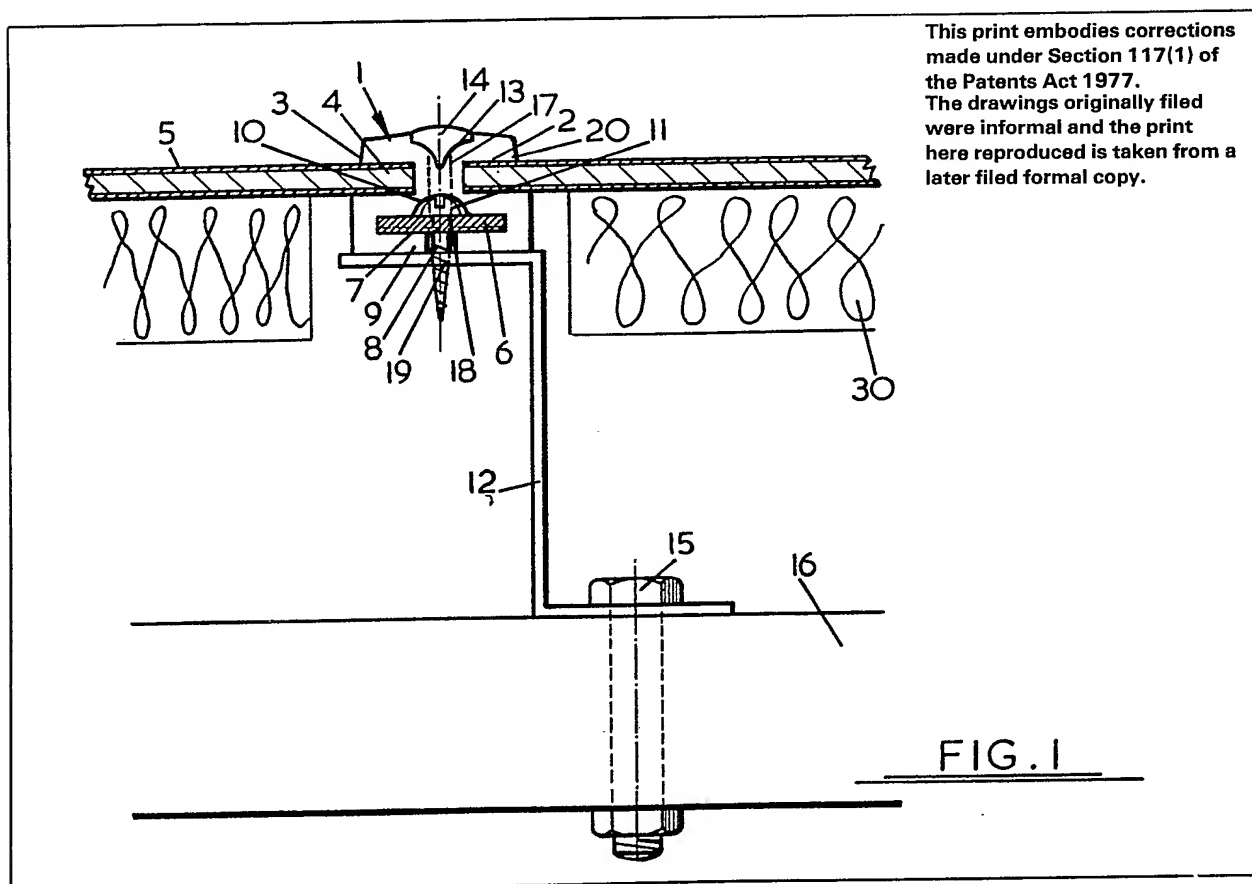
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(54) Seal and cladding system

(57) This invention relates to a seal 1 for use between the adjacent edges of two rigid or semi-rigid sheets 5 which seal 1 is formed of a resiliently deformable polymeric material and

has first and second channels 2 extending longitudinally along opposite sides 3 for each receiving the edge of a respective said sheet 5 in use of the seal 1, and a deformable stiffening means 6 preferably an aluminium or steel strip extending longitudinally of the seal 1 generally parallel to said channels 2. The stiffening means 6 extends transversely of the seal 1 generally parallel to the channels 2 and has a width such that it extends alongside at least the inner end portions of each of the channels 2. The seals are mounted on brackets 12 by screws 11 and a border closing strip is snap engaged into the groove 13. The stiffening means is inserted in the slot by bending back portions 9 of the seal.



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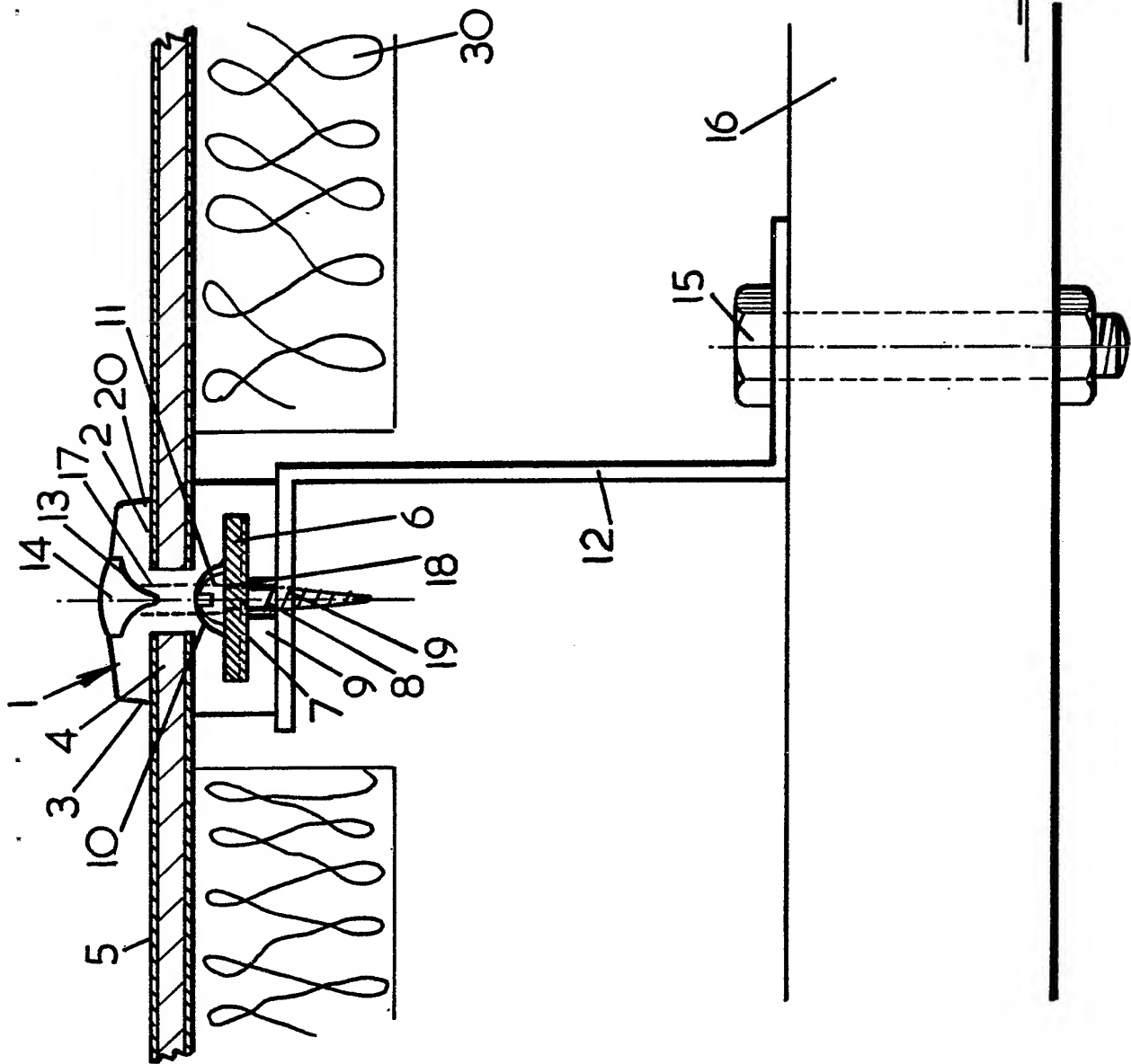
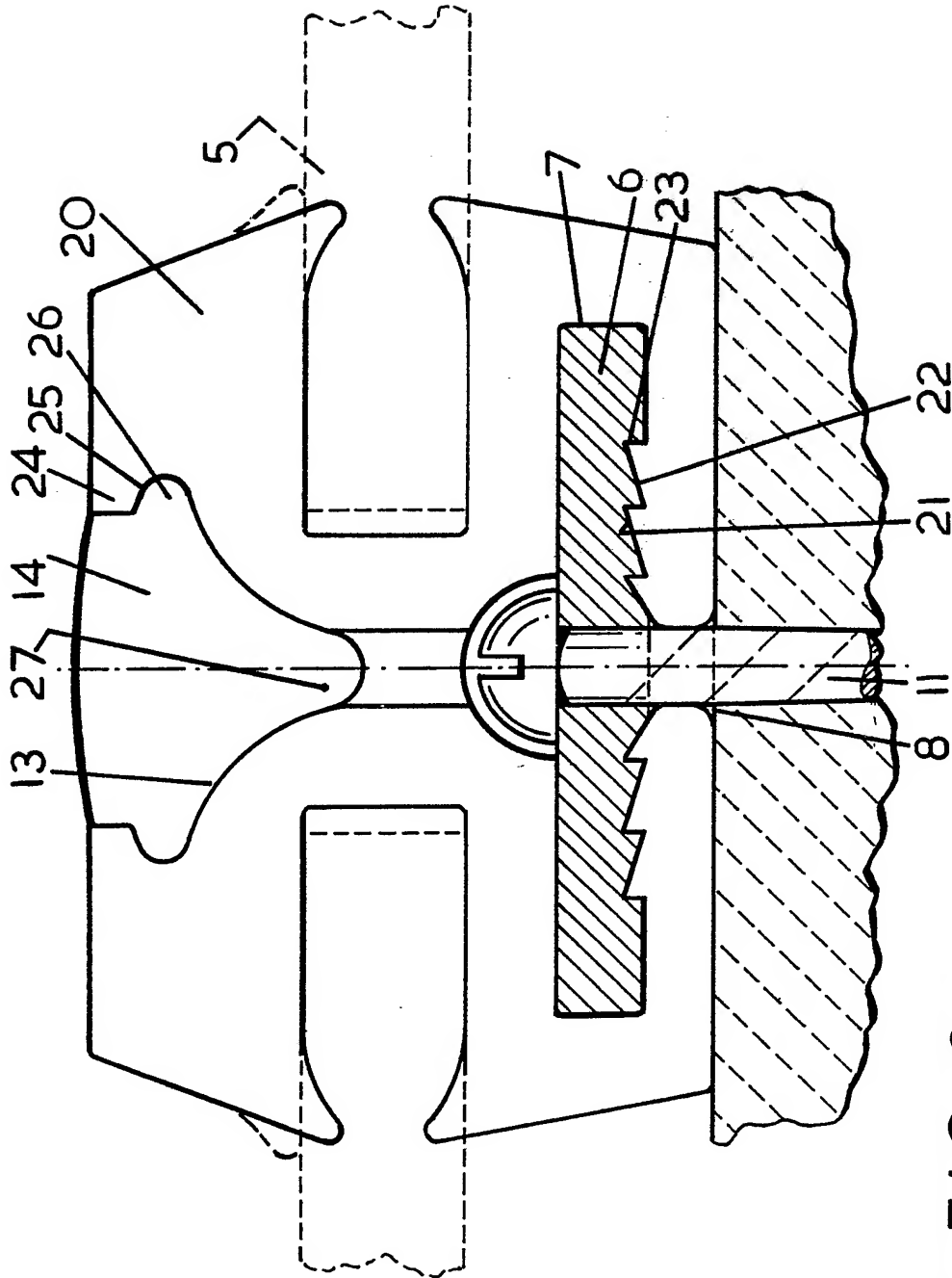


FIG. 1

FIG. 2

SPECIFICATION

Seal and cladding systems

The present invention relates to a seal for use between adjoining sheets of rigid or semi-rigid material and a cladding system including such a seal.

It has previously been proposed to provide seals between adjoining sheets of cladding material which seals are in the form of simple rubber gaskets having a slot in each side for receiving respective ones of the adjacent edges of the sheets. Whilst such a seal can provide adequate weather sealing under normal conditions it is susceptible to damage arising from relative movement of the cladding sheets and does not provide any appreciable resistance to such movement.

It is an object of the present invention to provide an improved seal which minimises one or more of these disadvantages.

The present invention provides a seal for use between the adjacent edges of two rigid or semi-rigid sheets which seal is formed of a resiliently deformable polymeric material and has first and second channels extending longitudinally along opposite sides for each receiving the edge of a respective said sheet in use of the seal, and a deformable stiffening means extending longitudinally of the seal generally parallel to said channels and extending transversely of the seal generally parallel to the channels and having a width such that it extends alongside at least the inner end portions of each of the channels.

Preferably the stiffening means has a width such that it extends transversely alongside a substantial portion, for example at least half, of the depth of each of the channels.

In a further aspect the present invention provides a cladding system for a structure comprising a plurality of sheets of rigid or semi-rigid material and a seal of the invention, adjacent edges of adjoining sheets being disposed within said channels of said seal, said seal preferably being provided with connection means for use in securing the seal to the structure.

An advantage offered by the invention is that it provides a satisfactory weather resistant seal between adjoining sheets, which seal contributes to the secure mounting of the sheets by its own structural properties resulting from the inclusion of the stiffening member and/or is resistant to shearing forces resulting from relative movement of the adjoining sheets.

Further preferred features and advantages of the invention will appear from the following description given by way of example of a seal of the invention illustrated with reference to the accompanying drawings in which:

Figure 1 is a section through a seal of the invention in use in a cladding system, and Figure 2 is a corresponding detail view of a modified seal.

Figure 1 shows a seal 1 having a generally rectangular cross-section with channels 2 extending inwardly towards each other from

opposite sides 3 of the seal for receiving the adjacent edges 4 of the cladding sheets 5.

A stiffening means 6 in the form of a semi-rigid carrier comprising a strip of metal such as aluminium or steel is disposed within a longitudinally extending slot 7 which is disposed generally parallel to the channels 2 in both longitudinal and transverse directions with respect to the seal. The strip 6 has a width such that it extends laterally outwards beyond the inner ends of the channels 2 so that outer portions of the strip 6 extend alongside inner portions of the channels 2.

The seal is, on the outer side of the slot 7 remote from the channels 2, divided by a longitudinally extending passage 8 disposed intermediate the sides of the slot 7 to allow insertion of the strip 6 therethrough into the slot 7 by bending back one or both portions 9 of the seal extending along either side of the passage 8.

On the opposite, inner, side of the slot 7, substantially opposite the passage 8, is provided a longitudinally extending recess 10 for accommodating the head of a round-headed screw 11 which is used to fix the seal on a support 12 as will be described in further detail below.

The outside of the seal 1 remote from the passage 8 is provided with a groove 13 formed for engageably receiving a sealing trim 14 in the manner of a plastic zip fastening (see Fig. 2).

As has already been mentioned the seal is essentially formed of a resiliently deformable polymeric material. Preferably an elastomeric material is used such as, for example, rubber or synthetic rubber, e.g. neoprene, or of a suitable plastics material. The stiffening means will usually be of metal whilst the sealing trim may be of the same material as the main body of the seal though optionally of a harder material such as a harder plastics or rubber material to improve retention thereof in the groove 13.

In use the seal 1 is attached to one arm of a support, such as a "Z" or "U"-shaped bracket 12 whose other arm is secured 15 to the structure 16 to be clad, by means of self-tapping screws 11 at more or less regularly spaced intervals. The screws 11 are screwed in through aligned apertures 17, 18 provided at intervals in the seal 1 and extending from the groove 13 to the recess 10 and through the strip 6, respectively, the screws passing through the groove 13. As the screws 11 pass through the seal 1 they begin to exit through the passage 8 and screw-threadedly engage the bracket 12 at correspondingly disposed apertures 19. As the screws 11 are fully driven home their heads engage the inner side of the strip 6 firmly clamping the portions 9 extending along either side of the passage 8 between the strip 6 and the adjacent arm of the bracket 12 to securely fix the seal 1 thereto.

The apertures 17, 18 in the seal 1 and 19 in the bracket 12 may be either preformed or formed by drilling on site, for example by drilling straight through the seal 1 and bracket 12 as the seal 1 is held in position thereon. Although the aperture 17

produced in the seal by such a single drilling would normally be smaller in diameter than the screw head (to ensure retention thereof by the strip 6) this will normally be acceptable insofar as the screwhead can push aside the resiliently deformable material of the seal sufficient to allow it to pass therebetween until, in its fully driven home position, it is accommodated in the recess 10.

With the seal 1 secured in position the adjacent edges 4 of cladding sheets 5 are inserted into the channels 2, normally after bending back towards the recess 13 face edge portions 20 of the seal 1 which extend along either side of the recess 13 to allow insertion. Upon release the face edge portions 20 spring back resiliently to their original position firmly clamping the edges 4 of the cladding sheets 5. In order to retain the edges 4 within the channel 2 even more securely against withdrawal from the channels 2, the latter may be provided with resiliently deformable fins (not shown) which extend inwardly from the sides towards the base of the channel 2 and which are conveniently made of a soft rubber or plastics material.

In practice it will be appreciated that a structure will usually be covered with a large number of cladding sheets with seals disposed therebetween so that many cladding sheets will be engaged with seals of the invention on opposite sides or on all their sides and in such cases they may be supported on the structure entirely by seals of the invention which constitutes a still further advantage.

Any conventional sheet cladding material may be used with seals of the invention including both flat and curved sheet material. In the latter case the seal may be readily preformed to conform with the curves thereof by virtue of its deformable stiffening means. The sheet material could, for example, comprise a material such as ALUCOBOND (trade name) which is a sandwich of polyethylene (for example, a 5 mm layer of polyethylene) between an outer facing of two sheets of 0.5 mm thick aluminium and which is optionally provided with a backing of a rigid insulation slab 30 for the purposes of *inter alia* improved insulation, which backing however stops short of the edges 4 of the cladding sheets 5 as shown in Figure 1.

It will be appreciated that various modifications can be made to the above described system without departing from the scope of the present invention. In particular the stiffening 6 may be profiled as shown in the cross-sectional view of Figure 2 in which like parts corresponding to those of Figure 1 have been designated by like reference numbers. The outer side of the slot 7 remote from the channels 2 has a complementary surface 21 which engages with the adjacent profiled outer side 22 of the stiffening strip 7.

As shown in Figure 2 the outer side 22 of the strip 7 is grooved so as to form a plurality of ratchet teeth extending on either side of the central longitudinal axis of the strip 6 with the

steeper sides and/or undercut 23 facing towards said longitudinal axis. Naturally in the case of the complementary ratchet teeth formations on the outer side 21 of the slot 7 the steeper and/or undercut sides 24 face towards said central longitudinal axis and thus away from the central channel 8 through which the fixing screws 11 extend. Such a construction helps to hold the stiffening strip 6 in place in the slot 7 and, where the 'ratchet teeth' are undercut, resists opening out of the portions 9 of the seal which extend along either side of the passage 81. This helps to improve rigidity and ease of handling of the seal with the inserted stiffening strip 6 prior to and during installation of the same and in particular prevents relative lateral movement between the strip 6 and the seal 1.

Figure 2 also shows in greater detail the engagement of the sealing trim 14 in the groove 13. The lips 24 of the groove 13 are undercut 25 for receiving therein opposed rib portions 26 of the trim 14 which tapers inwardly of the seal from said rib portions 26 into a ridge portion 27. Following completion of fixing of the seal 1 to the bracket 12 and structure 16 and installation of the cladding sheets 5, the groove 13 is closed by forcing the ridge portion 27 of the trim 14 into the groove 13, the rib portions 26 forcing apart the lips 24 which then spring back into their original position to retain said rib portions 26. By commencing insertion at one end of the trim 14 the rest of it can be readily eased into position somewhat in the manner of a moulded plastics type slide fastening.

CLAIMS

1. A seal for use between the adjacent edges of two rigid or semi-rigid sheets which seal is formed of a resiliently deformable polymeric material and has first and second channels extending longitudinally along opposite sides for each receiving the edge of a respective said sheet in use of the seal, and a deformable stiffening means extending longitudinally of the seal generally parallel to said channels and extending transversely of the seal generally parallel to the channels and having a width such that it extends alongside at least the inner end portions of each of the channels.

2. A seal as claimed in claim 1 wherein the stiffening means extends transversely alongside at least half of the depth of each of the channels.

3. A seal as claimed in claim 1 or claim 2 wherein the stiffening means is in the form of a strip.

4. A seal as claimed in claim 3 wherein the strip is of metal.

5. A seal as claimed in claim 3 or claim 4 wherein the strip is located in a slot substantially defined on its outer side away from said channels by two portions spaced apart so as to define a relatively narrow passage having a width substantially less than that of said strip whereby at least one of said portions can be bent back for insertion of the strip into said slot.

6. A seal as claimed in claim 5 wherein the inner side of the slot is provided with a longitudinally extending recess substantially opposite said passage for accommodating the head of a fixing screw.
7. A seal as claimed in claim 5 or claim 6 wherein the strip has a plurality of apertures through which the shanks of respective fixing screws can extend in use of the seal.
8. A seal as claimed in claim 7 wherein corresponding aligned apertures are provided in the seal and extending through a portion thereof between the channels.
9. A seal as claimed in claim 8 wherein a groove extends along the side of the seal across said aligned apertures for engageably receiving a sealing trim.
10. A seal as claimed in claim 9 wherein the sealing trim engages in the manner of a plastic slide fastening.
11. A seal as claimed in any one of claims 5 to 10 wherein the outer side of the strip and the slot are formed with complementary profiles.
12. A seal as claimed in claim 11 wherein the profiles are, when viewed in transverse cross-section of the seal, generally in the form of ratchet teeth with their steeper and/or undercut sides facing towards and away from the passage, in the case of the strip and slot, respectively.
13. A seal according to claim 1 substantially as described hereinbefore with particular reference to Figure 1 or Figure 2 of the accompanying drawings.
14. A cladding system for a structure which system comprises a plurality of sheets of rigid or semi-rigid material and a seal according to any one of the preceding claims, adjacent edges of adjoining sheets being disposed within said channels of said seal.
15. A cladding system according to claim 14 which includes connection means for use in securing the seal to the structure.
16. A cladding system according to claim 15 wherein the connection means comprises an angle bracket and fastening means for fixing the seal to the bracket and the bracket to the structure.
17. A cladding system according to claim 15 or claim 16 wherein the bracket means is a 'Z' bracket or a channel section bracket.
18. A cladding system for a structure which system is as defined in claim 14 and is substantially as described hereinbefore with particular reference to Figure 1 or Figure 1 as modified in accordance with Figure 2 of the accompanying drawings.